MIMAP Bangladesh

Micro Impacts of Macroeconomic and Adjustment Policies in Bangladesh

Technical Paper No. 01

Welfare and Poverty Impacts of Tariff Reforms in Bangladesh: A General Equilibrium Approach

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1. Introduction

Bangladesh, a small country with a geographical area of 147,570 sq. km. and a population of 132 million in 2001, faces formidable development challenges. The per capita income is low (US $ 370 in 2001) and nearly half of the population live below the poverty line. After more than two decades since independence in 1971, the major concern is to accelerate growth and reduce poverty to ensure acceptable living standards for the population.

In the 1970s, Bangladesh like other South Asian neighbours began its economic policies with a restricted trade regime. The policies reflected concerns to conserve foreign exchange, create an industrial base through protective domestic environment, and maintain the balance of payments at a sustainable level. The protective policies, however, led to distorted incentive structures creating allocative and productive inefficiencies, strains in the external sector and anti-export bias, and consequent slow growth of the economy. This prompted the policy makers to move towards a liberalized external sector strategy resulting in rapid trade liberalization in the early 1990s. As elsewhere in the world, trade liberalization in Bangladesh followed standard arguments: wider involvement and greater integration of the national economy with the global economy would benefit the country by improving external competitiveness thereby increasing exports and economic growth (Romer 1986, Lucas 1988, Rodrik 1995, Edwards 1998). This would also relax the constraints imposed by small domestic market, low savings, and limited access to technology and finance. While the potential benefits are well-emphasized, trade liberalization in Bangladesh raises important issues related to social goals: Does trade liberalization promote equity? How does it affect poverty? Are specific policy interventions needed to make trade liberalization equitable? The analysis of these issues requires empirical investigation of the propagation channels through which the impacts of trade liberalization are transmitted to the domestic economy and to various household groups.

Furthermore, the assessment of the impact of trade liberalization, particularly on income distribution and poverty, requires a framework that can analyze economy-wide repercussions with capability to examine general equilibrium effects. The present paper seeks to assess the characteristics of the transmission channels of trade liberalization policies in Bangladesh and examine their distribution and welfare implications. For the purpose, we have used a computable general equilibrium (CGE) model of the Bangladesh economy based on a social accounting matrix (SAM) framework.

The paper is organized as follows. Section 2 provides a brief overview of the economy and a review of trade policies in Bangladesh. The poverty situation is summarized in Section 3. Section 4 discusses the main features of the underlying SAM and the CGE model used in the study. The simulation results of the model are discussed in Section 5 while some concluding remarks are presented in Section 6.

2. The Economic Structure and Trade Policy Changes: An Overview

Structural Change and Economic Growth

The structure of the Bangladesh economy has undergone significant changes since the 1980s with the share of agriculture in GDP declining to about a quarter in the late 1990s (Table 1). In terms of employment, however, agriculture continues to remain the major sector with 62 per cent of total employed persons in 2000.

Table 1: Structure of Bangladesh Economy

(Per cent at constant 1995/96 prices)

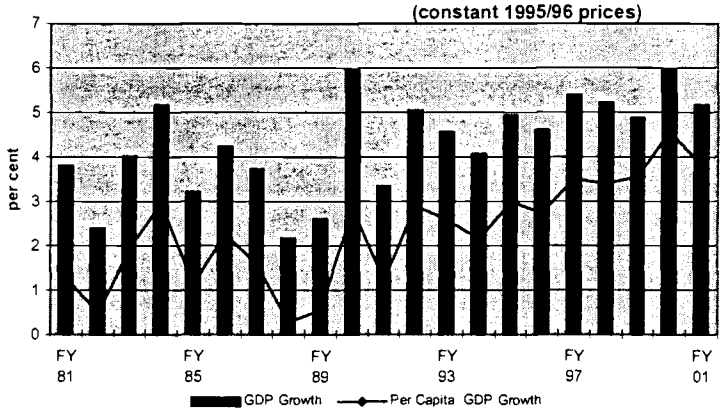
	1980	1985	1990	1995	2000
			Shares in GDP		
Agriculture	33.2	31.5	29.5	26.0	25.6
Industry	17.1	18.7	20.8	24.3	25.7
Services	49.7	49.8	49.7	49.7	48.7
Total	100	100	100	100	100

Note: Agriculture includes crop & horticulture, animal farming, forest & related activities, and fishing; Industry includes mining & quarrying, manufacturing, electricity, gas & water supply, and construction; Services include all other sectors.

Source: BBS 2001.

The average rate of GDP growth since the 1980s has been 4.2 per cent per year with wide variations over different sub-periods (Table 2). However, the growth of per capita GDP increased to 3.6 per cent in the late 1990s mainly due to spectacular success in reducing the rate of population growth. Still, the growth rates are well below the Bangladesh's potential.

Figure 1: Economic Growth in Bangladesh
(constant 1995/96 prices)



Source: BBS

Table 2:Economic Growth in Bangladesh

(Per cent at constant 1995/96 prices)

	1981-1985	1986-1990	1991-1995	1996-2000
Agriculture	2.7	1.9	1.6	4.9
Industry	5.7	5.9	7.5	6.4
Services	3.8	3.6	4.1	4.8
GDP	3.8	3.7	4.4	5.2
Per capita GDP	1.6	1.5	2.4	3.6

Source: BBS 2001

The growth performance over the period was underpinned by relatively steady rates of savings, investment and improvements in other macroeconomic indicators (Table 3). As a share of GDP, investment increased to 23 per cent in 2000 along with increases in domestic and national savings. The changes in the external sector were significant. The share of exports of goods and services in GDP rose to 14 per cent in 2000 from only 5 per cent in early 1980s.

Table 3:Selected Indicators of Bangladesh Economy

(As % of GDP)

	1981	1985	1990	1995	2000
Consumption	87.5	88.1	87.1	86.8	82.1
Private	83.0	84.0	82.9	82.2	77.6
General Government	4.5	4.1	4.2	4.6	4.5
Investment	17.6	16.3	17.1	19.1	23.0
Public	12.4	11.8	9.8	12.4	15.6
Private	5.2	4.5	7.3	6.7	7.4
Gross Domestic Savings	12.5	11.9	12.9	13.1	17.9
Gross National Savings	17.8	16.7	17.6	19.1	23.1
Exports	5.3	5.6	6.1	10.9	14.0
Imports	14.5	13.2	13.5	17.3	19.2

Source: BBS 2001.

Structure of Government Revenue

The changes in the structure of government revenue are given in Table 4. The share of government revenue in GDP is low: less than 10 per cent in the 1990s. There are two major sources of the government's revenue earnings of which tax revenue contributes more than 80 per cent.

Table 4: Structure of Government Revenue

	1980	1985	1990	1995	1998
Total revenue (Billion Taka)	14.76	35.83	65.19	148.90	188.99
Tax revenue	12.68	34.44	55.72	120.54	153.90
Non-tax revenue	2.08	2.39	9.47	28.36	35.09
Total revenue as % of GDP	5.3	6.4	6.5	9.8	9.4
% share of major taxes in total tax revenue					
Taxes on income and wealth	9.0	13.0	17.2	16.1	16.0
Taxes on commodities and transactions					
i) Taxes on imports/exports	68.3	62.6	48.5	49.3	50.3
Customs	49.3	50.2	39.0	30.1	31.1
Sales tax/VAT	19.0	12.4	9.5	19.2	19.2
ii) Taxes on domestic production	22.7	24.4	34.3	34.6	33.7
Total	100	100	100	100	100

Source: BBS 2001.

The non-tax revenue e.g. income from state-owned enterprises, fees and other miscellaneous receipts provided about 14 per cent of total revenue in 1980 which increased to 19 per cent during late 1990s. In case of tax revenue, the government's dependence on taxes on commodities and transactions is overwhelming and, in recent years, about 84 per cent of total tax revenue originates from such indirect taxes. Within the indirect tax structure, taxes on imports and exports contribute around half of total tax revenue. Since the 1980s, the relative importance of taxes on external transactions has declined while the share of taxes on domestic production increased. Still, the tax system remains narrowly based with relatively high dependence on indirect taxes and the external sector.

Changes in Trade Policies

After independence in 1971, Bangladesh followed the course of planned development with a major thrust to the public sector. The reversal of the policy of state control, however, started in 1975 with privatization of small-scale enterprises, removal of restrictions on private sector investment in the manufacturing sector, and trade liberalization measures.[1] Since the mid-1980s, a comprehensive programme of stabilization and economic reforms was initiated with the aim to create an open, liberalized and market-oriented economy. As a part of the liberalization process, a significant array of reforms, deregulation and structural adjustment measures were undertaken to facilitate the globalization of the economy.[2]

As a result of the economic reforms, Bangladesh's trade regime experienced substantial transformation in several respects including liberalization of external trade and foreign exchange regimes. The tariff reforms, in particular, were wide-ranging covering both tariff and non-tariff barriers. During the period, quantitative restrictions on imports were significantly dismantled and import procedures deregulated. Tariff structure was rationalized by reducing the average tariff rates and the number of duty slabs, lowering the gap between statutory nominal protection and observed levels, and narrowing down the tariff dispersion.[3]

Major Trade Policy Regimes

Since the 1970s, three major phases in trade policies may be identified. The period covering 1972 to 1978 was characterized by an import-substitution strategy through quantitative restrictions on imports, import licensing and strict exchange control measures. During 1979-1990, reforms towards a free market economy and export-led industrialization were introduced albeit at a slow rate. The third phase (1990-2000) was characterized by greater openness of the economy through accelerated trade liberalization, financial and fiscal reforms, and privatization.

The Bangladesh economy in the 1970s was highly protected and inward looking. During 1978 there were 36 different tariff rates ranging from zero to 400 per cent. Quantitative restrictions were also widespread. The reason for the restrictive trade policy was two-fold: to protect domestic industries and to raise revenue. This, however, resulted in an expansion of inefficient industries and misallocation of resources with adverse consequences on the export sector and the economy. Trade reforms, launched in the 1980s, aimed mainly at rationalizing and reducing tariffs and other import taxes, and eliminating import prohibitions and quantitative restrictions. Incentives were also introduced to boost exports and diversify the export base. In the 1990s, Bangladesh embarked on a liberal trade and investment policy. The 1991 Industrial Policy targeted the expansion of export-oriented industries and employment creation through attracting foreign investment and removing all barriers to make the industrial sector more efficient and internationally competitive.

[1] Most of these reforms were linked to the policy based lending operations of the IMF and the World Bank. The policy changes involved import liberalization, restrictions on credit expansion, rationalization of the tax system, and reduction in food and fertilizer subsidies. The Import Programme Credit (IPC) of the World Bank addressed issues to enhance efficiency in different sectors: constraints faced by major industries and restructuring of specific industries; export development; reforms in policies and institutions in agriculture; trade and industrial reforms; rationalization of tariff structure; and domestic resource mobilization.

[2] The programmes included different measures including fiscal, financial, trade and industrial policy reforms; public resource management; privatization; and institutional and sectoral reforms. These economy-wide reforms and structural adjustments, initiated in 1987, formed components of the Structural Adjustment Facility (SAF) and the Enhanced Structural Adjustment Facility (ESAF) of the IMF and the World Bank. For details on evolution of the policies, see Sobhan 1991, Mujeri et. al. 1993.

[3] Several changes may be noted: the highest customs duty rate was reduced from a level of 350 per cent in 1992 to 37.5 per cent in 2000; four slabs of duty rates were introduced in 2000 in place of 24 in the 1980s; and the number of items at the 4-digit Harmonized System (HS) code level banned and/or restricted due to trade or non-trade reasons declined from 315 in 1990 to 124 in 1997-2002.

Reduction of Import Barriers

The primary objective of reducing import barriers was to rationalize and simplify the trade regime through lowering tariff rates, phasing out quantitative restrictions, streamlining import procedures and introducing tax reforms. These reforms brought several major changes in the tariff structure:

(i) Average tariff rates significantly declined. The unweighted rates declined from 114 per cent in 1989 to 22 per cent in 1999 and import-weighted rates from 114 per cent to 19 per cent (Table 5);

(ii) The number of commodities under the four-digit code subject to quantitative restrictions declined from 433 in 1989 to 120 under the Import Policy of 1995-1997 (Table 6). In 1992, about 12 per cent of around 10,000 tariff lines were subject to such restrictions, which declined to less than 4 per cent in 1999. At present, less than 0.5 per cent of imports, mainly in the textile category, are subject to quantitative restrictions;

Table 5:Changes in Tariff Barriers

(Per cent)

		1989	1999
A.	**All products**		
	Mean tariff	114.0	22.1
	Standard deviation of tariff rates	84.9	14.6
	Weighted mean tariff	114.2	19.0
B.	**Primary products**		
	Mean tariff	85.1	21.1
	Standard deviation of tariff rates	58.7	13.1
	Weighted mean tariff	76.1	21.0
C.	Manufactured products		
	Mean tariff	123.2	22.4
	Standard deviation of tariff rates	89.8	15.0
	Weighted mean tariff	125.5	18.5

Source: World Bank 1999,2000.

Table 6: Removal of Quantitative Restrictions (QRs)

(at 4-digit HS code level)

Year	Total QRs in place	Trade reasons			Non-trade reasons
		Banned	Restricted	Mixed	
1986	478	275	138	16	49
1987	550	252	151	86	61
1989	433	165	89	101	78
1992	193	78	34	25	56
1994	109	7	19	14	69
1995-1997	120	5	6	17	92
1997-2002	124	5	6	17	96

Note: A total of 1,240 four-digit tariff headings exist under the Harmonized System (HS).

Source: Mujeri 2000.

(iii) The combination of maximum tariff rate reductions and tariff declines from 2.5 per cent to zero per cent on some products led to a narrowing down of tariff bands;

(iv) Import taxes such as development surcharges, regulatory duties and sales taxes were abolished in 1991[4]; and

(v) Various measures were introduced with a view to simplifying import procedures. In 1986, two lists were introduced to replace the 'positive list' (which contained all goods that could be imported along with their constituent raw and packing materials): all banned items were listed under a 'negative list' and those importable under certain conditions were registered on a 'restricted list'.[5] All other products can be imported freely. Over the years, Import Policy Orders showed substantial reduction in the number of banned and restricted items.

Export Promotion Measures

The Government attempted to promote exports through various measures. The policies for export promotion emphasized the need to diversify the export base, stimulate higher value-added exports, improve the quality of exports and develop backward linkage industries. Incentives are provided in the form of special bonded warehouses, export processing zones (EPZs), duty drawback and a number of other methods.[6] Against the backdrop of phasing out of the Multi Fibre Arrangement (MFA) by 2005, the aim is to achieve self-sufficiency in fabrics to meet the requirements of the garment industry.

The Exchange Rate System

In line with the overall framework of trade reforms, gradual liberalization of foreign exchange restrictions was implemented. The Government replaced the policy of maintaining a multiple exchange rate system by a unified exchange rate in 1992 and the domestic currency, Taka, was pegged to a currency-weighted basket. A policy of creeping devaluation is now followed to maintain exchange rate flexibility and export competitiveness within a more market-determined exchange rate regime. The Taka has been made convertible for all current account transactions along with measures to set in motion the inter-bank foreign exchange market.

The trade policy reforms brought significant changes in the external sector of the economy. The growth and structural change in merchandise trade can be seen in Table 7.

Table 7: Growth and Structural Change in Merchandise Trade

A. **Growth**			
		Average annual % growth	
		1980-1990	**1990-1997**
Export			
	Volume	7.6	12.9
	Value	7.6	13.2
Import			
	Volume	1.8	9.1
	Value	3.7	11.8

[4] Despite reductions in many tariffs, total tariffs still remain high by international standards since, in addition to customs duty, several other taxes are levied upon imports e.g. value added tax, supplementary duty, infrastructure development surcharge and license fee. Thus, although the average implicit (expost) customs duty at present is around 14 per cent, the total average expost 'tariff' is approximately 27 per cent.

[5] For example, out of the 391 items which were listed under the 'negative list' in 1986, only 24 remained in 1994. Similarly, the number of items on the 'restricted list' over the same period declined from 351 to 91.

[6] The support system to the exporters is highly complex, fragmented and consists of wide range of measures applying in specific circumstances. Several measures may be noted e.g. rebate on insurance premiums, income tax rebate, export credit guarantees, incentives for export of non-traditional industrial products, export promotion fund, retaining foreign exchange from export earnings, VAT refunds, tax holiday and other incentives.

B. Structural Change	Merchandise exports		Merchandise imports	
	1980	1998	1980	1998
Total value ($ million)	793	5,141	2,353	6,862
		% of total		
Food	12	7	24	15
Agricultural raw materials	19	2	6	5
Fuels	0	0	9	7
Ores and metals	0	0	3	2
Manufactures	68	91	58	69

Source: World Bank 2000.

Compared with an average annual growth of around 8 per cent per year in the 1980s, merchandise exports in both volume and value terms increased to 13 per cent in the 1990s. In case of imports, the rates increased to around 9 per cent for volume and 12 per cent for value in the 1990s compared with less than 2 per cent and 4 per cent for volume and value respectively in the 1980s. The trade basket, however, indicates an increasing concentration of manufactured goods accounting for 91 per cent of total merchandise exports in 1998. The category consists of an assortment of simple manufactured goods e.g. readymade garments, leather and leather manufactures, fabrics, and made-up articles. This shows that Bangladesh's exports have increased through exporting more of same or similar goods and, in this perspective, displayed little dynamism. Nevertheless, the share of foreign trade (merchandise exports and imports) in GDP increased from 20 per cent in 1981 to over 33 per cent in 2000 – exports from 5 per cent to 14 per cent and imports from 15 per cent to 19 per cent.

The global economic integration of the country also increased during the period. As indicators, we use the importance of trade by trade in goods as share of both PPP GDP and goods GDP and the dynamism of trade regime by the difference in growth in real trade and growth in real GDP. For measuring importance of private capital flows, the indicators are gross private capital flows and gross foreign direct investment, as share of PPP GDP (Table 8).[7] The values indicate that though the extent of integration of the Bangladesh economy with the rest of the world is less compared to low income countries, it compares favourably with the South Asian average.

Table 8 Extent of Bangladesh's Global Integration: A Comparative Perspective

	Trade related indicators					Capital flow related indicators			
	Trade in goods as % of				Dynamism of trade regime	As % of PPP GDP			
	PPP GDP		Goods GDP			Gross private capital flows		Gross foreign direct investment	
	1988	1998	1988	1998	1988-98	1988	1998	1988	1998
Bangladesh	4.2	7.0	29.9	56.1	7.2	0.3	0.8	0.0	0.2
India	3.3	3.9	18.2	33.6	4.5	0.2	0.9	0.0	0.1
Nepal	5.9	6.5	35.7	...	8.0	0.5	0.1	0.0	0.0

[7] The trade in goods as a share of PPP GDP is the sum of merchandise exports and imports measured in current US dollars divided by the value of GDP converted to international dollars using purchasing power parity (PPP) rates. The trade in goods as a share of goods GDP is the sum of merchandise exports and imports divided by the value of GDP less value added in services (all in current US dollars). The growth in real trade less growth in real GDP is the difference between annual growth in trade of goods and services and annual growth in GDP using constant price series. Gross private capital flows are the sum of absolute values of direct, portfolio, and other investment inflows and outflows recorded in the balance of payments financial account excluding changes in assets and liabilities of monetary authorities and general government. Gross foreign direct investment is the sum of absolute values of inflows and outflows of foreign direct investment recorded in the balance of payments financial account. It includes equity capital, reinvestment of earnings, other long term capital and short term capital. See World Bank 2000.

Pakistan	9.3	8.2	54.8	53.4	0.1	0.7	1.6	0.2	0.3
Sri Lanka	11.5	17.9	88.0	118.8	2.9	2.1	1.8	0.2	0.4
South Asia	4.2	4.8	24.2	40.5	...	0.3	0.9	0.0	0.1
Low income countries	6.8	8.3	38.6	62.5	...	0.7	2.0	0.2	0.9

Note: For explanations, see footnote 7.

Source: World Bank 2000.

The trade related indicators, in particular, suggest increased global integration of the Bangladesh economy in the 1990s. During the period, Bangladesh's trade regime showed more dynamism compared with other South Asian countries except Nepal.

3 Changes in Poverty and Inequality

Poverty as a multi-dimensional phenomenon has many roots in Bangladesh which cover both income and human poverty.[8]

Changes in Income Poverty

The inter-temporal estimates of income poverty in Bangladesh show substantial variations due to differences in underlying assumptions and methodologies.[9] Some trends, however, can be discerned with available data (Table 9). As measured by the head count index, the incidence of poverty declined to 50 per cent in 2000 from 59 per cent in 1983/84.[10]

Table 9: Inter-temporal Changes in Incidence of Poverty

Year	Head count ratio (per cent)			No. of poor (million)		
	Rural	Urban	Total	Rural	Urban	Total
1983/84	59.6	50.2	58.5	50.3	5.6	55.9
1988/89	59.2	43.9	57.1	53.7	5.7	59.4
1991/92	61.2	44.9	58.8	57.5	6.4	63.9
1995/96	55.2	29.4	51.0	53.6	5.7	59.3
2000	53.0	36.6	49.8	53.5	9.2	62.7

Note: The figures are based on HES of the Bangladesh Bureau of Statistics. The poor in the HES are estimated using the cost of basic needs (CBN) method and are taken as those living below the poverty line which corresponds to an intake of 2122 kcal/person/day and a nonfood allowance corresponding to nonfood expenditure among households whose food expenditure equals the food poverty line. The

[8] This brings out the importance of conceiving poverty within a broader framework entailing, in addition to purchasing power, other forms of deprivation e.g. capability and entitlement, participation, empowerment, vulnerability and crisis coping capacity, networking capacity, intra-household and gender disparities, access to credit and resources and other socio-cultural concerns. The income poverty is usually defined by the Foster-Greer-Thorbecke (FGT) class of poverty measures while Human Poverty Index (HPI) is a synthetic expression of non-income dimensions of poverty. See Foster et. al 1984, Anand and Sen 1997.

[9] For an analysis of the implications of different methodologies on poverty estimates, see Ravallion 1990, Ravallion and Sen 1996. The alternative poverty estimates highlight important issues of measurement of poverty, aggregation of numbers, choice of calorie norms and other dimensions. For a review of available estimates, see Rahman and Haque 1988, Hossain and Sen 1992, Mujeri 1999.

[10] A direct comparison of poverty trends since the 1970s has been avoided due to several methodological problems. A notable problem, for instance, is the change in data collection method in the Household Expenditure Survey (HES) involving a shift from 'memory recall' prior to 1983/84 to 'diary keeping' after wards. The 1985/86 HES results have also been excluded due to controversy regarding the quality of data.

number of the poor has been derived by the author using estimated population and its rural-urban distribution implicit in respective surveys.

Source: World Bank 1998, BBS 2001.

Both urban and rural poverty declined although the incidence of rural poverty remained higher than urban poverty. Over the entire period, poverty incidence declined at a slow rate with substantial variations across different sub-periods and between rural and urban areas. During 1984-2000, the absolute number of the poor increased to 63 million from 56 million – an increase of 7 million over 16 years when total population increased by about 30 million.

The changes in income poverty since the 1980s highlight two points. First, the overall progress in poverty reduction is quite modest.[11] Between 1984 and 2000, rural poverty declined by only 7 percentage points. Given the fact that nearly 80 per cent of the poor live in rural areas, despite the decline of urban poverty by 14 percentage points during the period, total poverty declined by only 9 percentage points. Second, compared with the instability in poverty reduction in the 1980s, poverty declined consistently in the 1990s.

Changes in Human Poverty

The human development index (HDI) value of Bangladesh nearly doubled between 1960 and 1992 to 0.309 showing an annual average rate of increase of 2.7 per cent. The progress was rapid in the 1990s with a HDI value of 0.485 in 1999 (BIDS 2001). This indicates a faster pace of human development than the rate of economic growth during the period.

The human poverty index (HPI) measures the distribution of progress in human development and shows the extent of human poverty.[12] The HPI value declined consistently since the 1980s. Compared with 61.3 per cent in 1981-83, the HPI value was 47.2 per cent in 1993-94 and 41.6 per cent in 1995-97 (BIDS 2001). These results indicate that Bangladesh achieved faster progress in reducing human poverty than income poverty. The average rate of decline in HPI was 2.8 per cent per year since the early 1980s compared to 1.8 per cent for income poverty. Moreover, the progress in reducing human poverty has been faster in the 1990s.

Changes in Inequality

In Bangladesh, the inequality in the distribution of consumption is lower than that of income and wealth.[13] In the backdrop of a fairly modest rate of economic growth, inequality increased sharply in the 1990s (Table 10). The Gini index of consumption expenditure in both rural and urban areas remained largely unchanged till 1992. The urban Gini index increased to 37 per cent in 1996 and declined somewhat in 2000. Similarly, inequality in rural areas rose to 28 per cent over the same period. In case of income inequality, the trends were similar but the inequalities were much higher with a sharp increase in Gini index during the mid-1990s. Urban inequality increased more than rural inequality and the disparity between rural and urban areas widened during the period (World Bank 1998).

[11] The slow progress in poverty reduction is robust to the choice of poverty measures. All available studies indicate similar decline in terms of distributionally sensitive poverty measures e.g. poverty-gap and squared poverty-gap indexes. See Mujeri 2000.

[12] The HDI value gives the overall progress in achieving human development in three basic dimensions measured by life expectancy, educational attainment and income. The HPI is a composite index of deprivation in three basic dimensions of human life: a long and healthy life, knowledge and economic provisioning. For details on indicators and computation methodology, see UNDP 2000.

[13] Although information on inequality of wealth is scanty, the ownership pattern of productive assets reveals marked variations across rural and urban areas and among poor and non-poor households. The value of assets per urban household is estimated at almost three times that of rural household on average. For the non-poor

Table 10: Changes in Growth and Inequality

	Poverty Line (Tk./person/month)	Mean Consumption (Tk./person/month)	Mean Consumption/ Poverty Line (%)	Gini Index (%)	
				Consumption	Income
Urban					
1983/84	301.72	396.53	131	29.8	37.0
1988/89	453.65	695.19	153	32.6	38.1
1991/92	534.99	817.12	153	31.9	39.8
1995/96	650.45	1372.47	211	37.5	44.4
2000	724.56	1291.53	178	36.6	45.2
Rural					
1983/84	268.92	284.84	106	24.6	35.0
1988/89	379.08	435.39	115	26.5	36.8
1991/92	469.13	509.67	109	25.5	36.4
1995/96	541.77	661.47	122	27.5	38.4
2000	634.48	820.20	129	29.7	36.6

Source: BIDS 2001, BBS 1998.

Poverty Profile and Determinants

In analyzing the impact of trade liberalization, it is important to consider poverty characteristics and identify which set of factors have a strong influence on income and well-being of the poor. The poor have substantial heterogeneity both in terms of socioeconomic, spatial, gender and other differences and household or individual attributes. Physical and human resource endowments, features of household demography, nature of occupation and employment, and similar indicators are useful pointers in identifying who the poor are.

In rural areas, poverty is higher among those who possess little or no land, who have no education and marketable skills, and who depend on wage labour for livelihood. Agricultural labour households and tenants have a high incidence of poverty as do non-agricultural casual workers and self-employed workers with little capital. About 78 per cent of the households who report agricultural wage labour as their principal occupation live in poverty (BBS 1998). In urban areas, households headed by casual and manual labourers have a high incidence of poverty as do participants in the informal sector with little assets. The above characteristics of poverty indicate several factors which can have significant influence in increasing the incomes of the poor. Access to land and non-farm activities, education, remittances, and basic infrastructure like road and electricity are important avenues to reduce both incidence and depth of poverty (BIDS 2001). In short, poverty reduction in Bangladesh needs measures to address underlying causes of poverty and practical interventions to mitigate poverty. Obviously, high economic growth that generates decent income and productive employment for the poor is important in widening socioeconomic opportunities, generating resources for the government to provide basic services, and increasing returns from human and non-human investments. In addition, direct efforts through several channels e.g. capability-raising by education, health and nutrition interventions; targeted employment and safety-nets programmes; and improvements in non-material dimensions of well-being including gender gaps, insecurity, powerlessness, and social exclusion are important dimensions to enhance the poor's prospects in pursuing sustainable livelihood options.

While poverty profile and its determinants are deeply rooted in structural characteristics and asset ownership pattern in the country, trade liberalization generates forces which bring changes in the

households, the average asset value is twice that of the poor in rural areas. In urban areas, the disparity is much higher: the average asset value of the non-poor is five times that of the poor (See Mujeri 2000).

underlying meso-economy in which the poor survive. The changes in the structure of labour demand and in prices due to changes in trade policies are important factors which affect income distribution and poverty. Similarly, trade liberalization can bring new household dynamics for the poor e.g. through migration of earning adult members or retrenchments and job losses due to industrial closures. With opening up of the economy and exposure to global competition, the poor may be put to greater stress of adjustment in the short run and may remain behind in poverty in the longer run. The complexities of poverty dynamics and the intricate nature of trade liberalization mediated through the domestic market channels make the issue of links between the two an empirical question, the answer to which largely depends on specific contexts.

Costs and Benefits of Trade Liberalization

The links between trade liberalization and poverty depend on how the propagation channels work through which liberalization shocks are transmitted to the economy and to different household groups[14]. There exists rather inconclusive evidence on the nature and extent of costs and benefits of trade liberalization[15]. The proponents of liberalization argue that the benefits of liberalization emanate from several sources e.g. cheaper consumption, greater efficiency in production and allocation of resources, and access to new technologies and ideas. On the other hand, the costs entail elimination of domestic producers by large multinationals, reduced opportunities for learning-by-doing, and increased volatility of the domestic economy.

Liberalization and Domestic Prices

The argument for trade liberalization runs through its impact on domestic prices of imported commodities: lower tariffs and implicit small country assumption should result in lower domestic prices. In real world, the impact on domestic prices, however, depends on two important factors e.g. costs of domestic production relative to the tariff-inclusive price and the degree of competition in the domestic market. For instance, if domestic production were inefficient prior to liberalization, there might be little effect on prices of domestically produced goods resulting in increased market share of imported goods and consequent costly adjustments for the domestic producers.

Liberalization and Economic Growth

Despite strong theoretical links between liberalization and growth, evidence of such links in practice is a matter of debate.[16] The empirical link between trade liberalization and growth is difficult to establish not only because it is difficult to accurately measure the trade stance of a country but also due to the fact that trade liberalization alone is not adequate to tap the opportunities created through liberalization. Investments in infrastructure, macroeconomic stability, and other good policies are essential to enhance the ability of a country to pursue higher growth. The balance of the arguments seems to suggest that, while liberalization may have a useful role to play in promoting growth, success in the effort needs complementary policies of human resource development, removal of infrastructure bottlenecks, and sound financial and macroeconomic policies.

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[14] Such links are not so obvious due to a number of factors. For example, different measures of trade liberalization are weakly correlated and the nature of links between trade liberalization (or openness of an economy) and domestic economic variables may depend on the choice of particular openness measure. For a discussion on weak correlation among different measures of trade openness, see Harrison 1996, Pritchett 1996.

[15] For a review of available evidence, see McCullock et. al. 2001.

[16] The theoretical models of endogenous growth suggest positive association between openness and growth through several channels e.g. embodied technology, availability of inputs, technical assistance and learning, and reduced networking costs. See Grossman and Helpman 1991, Obstfeld and Rogoff 1996. For evidence on positive relationship between openness and growth, see Greenaway et. al. 1998. Edwards 1998, Frankel and Romer 1999. For a strong critique of the arguments favouring the positive association, see Harrison 1996, Harrison and Hanson 1999.

Liberalization and Domestic Volatility

Increased volatility is considered harmful for economic growth particularly due to its adverse impact on investment. The theoretical arguments suggest that the overall effect of trade liberalization on volatility of output and terms of trade depends on relative strength of specialization and risk diversification effects. If the former is dominant as a result of greater economic integration allowing specialization in goods with comparative advantage, then a country's output or terms of trade volatility may increase. However, if trade liberalization leads to greater risk diversification than the increased volatility due to specialization, the net result may be reduced output or terms of trade volatility. The empirical evidence on the issue is limited to draw any definite conclusion. Some evidence, nevertheless, indicates that more open economies have greater income volatility which, however, does not necessarily lead to increased consumption volatility due to higher dependence on imports (Rodrik 1995).

In short, while the theoretical arguments and empirical evidence are inconclusive, two important conclusions may be drawn regarding the costs and benefits of liberalization: first, trade liberalization has both benefits and costs and whether benefits outweigh costs largely depends on how a country 'manages' the process to its own advantage: and second, the mix of costs and benefits and its relative significance depends strongly on specific circumstances of a country.

Trade Liberalization and Poverty: Transmission Channels

Any attempt of linking trade liberalization and poverty and identifying the transmission channels faces several complexities. In addition to difficulties in measuring trade liberalization and associated problems in assessing specific impact on the domestic economy, the heterogeneity of the poor is an issue in itself. Since the poor differ among themselves and there are many reasons why the people are poor, the effects of trade liberalization will differ across the poor as a group. There will be gainers and losers and any measure of net impact is difficult to arrive at. Moreover, the gains and losses are likely to have significant time dimension so that the short run stress on particular groups of the poor may be more than compensated in the longer run. As a result, the static effects of trade liberalization are likely to be different in many respects from its dynamic consequences.

In the present study, we focus on main channels through which trade liberalization influences poverty outcomes in Bangladesh. Since poverty outcomes are manifested and measured at the household level, we shall concentrate on how the meso-environment facing the households, particularly the poor households, is affected by the forces of trade liberalization.[17] The direct effect of trade liberalization through the price channel depends on how changes in prices of importable due to tariff changes, affect the prices faced by households of the imported commodities and get transmitted to other commodities as well. Several dimensions of the channel determine the nature of the impact e.g. nature of the domestic market and its underlying institutions and importance of the imported commodities and foreign trade in general. Similarly, changes in production will affect wages and level of employment depending upon the characteristics of the labour market and relative flexibility of wages and employment. The changes in the government's revenue and expenditure patterns and how such changes affect the poor depend on several factors e.g. extent of revenue loss due to trade liberalization and alternative forms of taxation introduced to maintain revenue neutrality.

4 Outline of the Methodology

The general methodology has been to use a framework of analysis, which allows to examine the consequences of policy changes at sectoral, and at macro level and to estimate their poverty and

[17] Although intra-household distribution having significant implications on gender aspects of poverty are also affected by trade liberalization, the scope of the paper limits itself to household-level impact only.

distribution impacts at the household level. To examine the above issues a computable general equilibrium technique has been employed. A Computable General Equilibrium (CGE) model examines the consequences of policy reforms within a constrained optimization framework. A Social Accounting Matrix (SAM) prepared for the year 1995/96 serves as the consistent and comprehensive database for the above-mentioned exercises.

The Bangladesh Social Accounting Matrix for 1995/96

As mentioned above the model is numerically calibrated to a 1995/96 Social Accounting Matrix (SAM). The main sources of information for the SAM are (a) 1993/94 Input-output table prepared by Bangladesh Institute of Development Studies (BIDS 1998): (b) Household Expenditure Survey 1995/96 by Bangladesh Bureau of Statistics (BBS. 1998): (c) Labour Force Survey by Bangladesh Bureau of Statistics (BBS, 1998); and (d) National Income Estimates by Bangladesh Bureau of Statistics.

Accounts

The 1995/96 SAM identifies the economic relations through *four types of accounts*: (i) production activity accounts for 26 sectors; (ii) 7 factors of productions with 6 different types of labour and one capital; (iii) current account transactions between 3 main institutional agents; households and unincorporated capital, government and the rest of the world; and (iv) one consolidated capital accounts to capture the flows of savings and investment by institutions and sectors respectively.

Activity

The activity account is represented by 26 producing activities. These are derived from the 79 sectors of the 1993/94 Input-output table. Due to lack of adequate information, the distinction is not made between activity and commodity and hence they are synonymous.

Households

An important feature of the SAM for 1995/96 is the decomposition of the households into 7 groups. The household groups differ with respect to employment status, income levels and expenditure patterns. Pyatt and Thorbecke (1976) have suggested location, sociological and wealth criteria to classify household groups[18]. In this particular case, location (rural-urban), land ownership, occupational status, and level of education information, contained in the HES 95/95, has been used for household classification.

Labour Factor

The SAM for 1995/96 also account for decomposition of the labour factor into 6 groups based on gender and skill level of the workers. The labour factor classification may be used to examine the consequences of policy measures on "factorial" income distribution. Information of level of education and gender, contained in the LFS 95/95, has been used for labour factor classification.

The disaggregation of factors, households. activities and institutions in the SAM and model is given in Table 11.

[18] For instance, the location criterion which distinguishes a household as urban or rural is useful since it captures many aspects of duality. Depending on this distinction. individuals with otherwise similar characteristics are likely to be paid different wages, have different job opportunities and employment expectations and generally be subject to different sets of parameters in their socio-economic behaviour (Pyatt et al. 1984).

Table 11: Disaggregation and description of factors, institutions and households

Set	Description of Elements
Factors of Production	
Labour (6)	• **Female**: 3 categories according to skill levels (low, medium and high) Low: 0-V class; Medium: VI-X class; and High: X Plus • **Male**: 3 categories according to skill levels (low, medium and high) Low: 0-V class; Medium: VI-X class; and High: X Plus
Capital (1)	• 1 type only
Institutions	
Households (7)	• **Rural** *Agriculture*: 3 categories according to land ownership Labourer household: 0-0.49 ha; Small Farmers: 0.5-2.49, Large Farmers: >2.5 ha. • **Rural** *Non-Farm*: 1 category according to occupation • **Urban**: 3 categories according to the level of education of the household's head Low Skilled: 0-V class; Medium Skilled: VI-X class; and Professional: X +
Others (2)	• Government • Rest of the World
Activities	
Agriculture (7)	• **Crops** *Non-traded*: Aman and Boro • **Crops** *Traded*: Grains and Commercial Crop • **Non-crops** *Non-traded*: Forestry • **Non-crops** Traded: Livestock and Fish
Industries (12)	• **Food Processing** *Traded*: Rice Milling, Ata and Flour, Other Food and Tobacco • **Textiles** *Traded*: Clothing, Read Made Garments and Leather. • **Others** *Traded*: Chemical, Fertilizer, Petroleum Products, Machinery and Miscellaneous Industries
Services (6)	• *Non-Traded*: Construction, Gas, Trade, Social, Public Administration, Financial Service and Other Services

Model

Computable general equilibrium models captures a detailed accounts of the circular flows of receipts and outlays in an economy. It satisfies general equilibrium conditions in market simultaneously. Such models are useful to analyse associations between various agents of the economy.

In line with most of CGE models, the model has been solved in comparative static mode and provides an instrument for controlled policy simulations and experiments. Solution of each simulation presents complete sets of socio-economic, meso and macro level indicators such as activity/commodity prices, household incomes and expenditures, factor demand and supplies, gross domestic products, exports and imports, and household poverty situation. The model is calibrated to the SAM to exactly reproduce the base year values[19].

[19] In calibration procedure, most of the model parameters are estimated endogenously keeping the various elasticity values fixed.

Production Structure

A nested production structure is used for each sector. At the top level, real value added and intermediate inputs are combined via a Constant Elasticity Substitution (CES) production to produce gross output. The value added is a CES aggregate of 7 types of factor inputs, which includes capital, and 6 different categories of labour inputs. The composite intermediate input is composed of domestic and imported intermediates.

Demand Structure

Structure of demand is composed of demand for private and public consumption expenditure, investment demand and exports demand. Private consumption demand is specified by a Cobb-Douglas function which is combined with a nested CES function of composite products. The distribution of investment by sector is modeled using a fixed-coefficient specification. The Leontief specification applies to both domestically produced and imported investment. The formulation of investment is purely static: there is no link between increased savings today and additional investment in a subsequent time period. In a dynamic model. a policy. which has a negative impact on welfare in the current period, may yield substantial welfare gains in the long run. These inter temporal features are not considered here. Total government expenditure is assumed to be exogenous. The distribution of government expenditure by sector is modeled using a fixed-coefficient specification. Export demand is specified by a downward sloping world demand for exports.

System Constraints and Equilibrium Conditions

There are four constraints in the system. The real constraint refers to domestic commodity and factor market; the nominal constraint represents two macro balances: the current account balance of the rest of the world and the savings-investment balance.

Sectoral supply is a composite of imports and output sold in the domestic market. Composite demand, on the other hand, includes final demands (i.e. private and public consumption expenditure and investment) and intermediate input demand. Variations in the sectoral prices assure equilibrium between sectoral supply and demand.

In the case of factor market, it is generally assumes that total quantities of factors supply are fixed and hence variations in the factors returns (i.e. wages and rents) ensures equilibrium between factor demand and supply. This specification implies full mobility of factors across producing activities. However, given the comparative static nature of the analysis, full mobility specification is adopted for the 7 types of factors (6 types of labour and one capital) factors where variations in their returns (e.g. wages and rental values) assures equilibrium in the factor market.

The inflows (transfers to and from domestic institutions) are fixed but imports and exports are determined endogenously in the model. Foreign savings is fixed in this model and nominal exchange rate act as numeraire.

Finally, for the savings-investment equilibrium, the model treats the investment decision as given and hence savings has to adjust to ensure the equality to the fixed value of investment. The basic approach is to allow the savings propensity of one of the domestic institution to vary.

Table 12: Summary of Model Features

• All factors (Labour and capital) are mobile across producing activities
• Primary factor supplies are exogenous and fixed

• The world prices of imports are exogenous invoking the small country assumption
• On the export side, Bangladesh is assumed to have some market power invoking endogeneity of domestic and world price of Bangladeshi exports
• Current account balance or deficit is fixed
• Imports and domestically produced goods are imperfect substitutes
• Output produced for domestic and export market reflects differences in quality
• Savings of domestic institution adjust to equate given investment
• Nominal exchange rate act as the numeraire
• Excess demand conditions are satisfied

Salient Features of the Base Scenario

Main features of the Bangladesh economy as reflected in the base case are depicted in Table 13. It shows sectoral tariff rates, value added shares, and imports and exports shares by sectors, proportions of imports and exports to sectoral outputs and elasticity of export demand (ex) and CES function (em).

Table 13: Salient Features of Base Scenario

	Tm	Em	ex	V_i/V	M_i/M	E_i/E	M_i/Q_i	E_i/Q_i
Aman Paddy		1.8	3.0	3.90				
Boro Paddy		1.8	3.0	4.44				
Grains	16.51	1.8	3.0	0.38	1.65		34.63	
Commercial crops	7.18	1.8	3.0	4.28	2.94	0.33	5.99	0.40
Livestock		1.8	3.0	4.48	0.92	0.09	1.99	0.12
Fish		1.8	3.0	2.16		7.73	0.00	15.59
Forestry **(22.32)**		1.8	3.0	2.68				
Rice Milling	3.43	1.8	3.0	6.07	0.22		0.18	
Ata and Flour	12.16	1.3	1.6	0.50	0.02		0.17	
Other Food	37.42	1.3	1.6	1.67	3.30	4.88	8.83	7.82
Leather		1.3	1.6	0.63	0.11	11.05	0.90	53.49
Clothing	24.42	1.3	1.6	3.89	9.00	12.20	16.03	13.02
Ready Made Garment	2.96	1.3	1.6	3.00	0.54	60.84	1.40	94.67
Tobacco	2.04	1.3	1.6	0.64	0.04		0.55	0.01
Chemical	20.98	1.3	1.6	0.60	9.44	0.20	64.39	0.81
Fertilizer	0.08	1.3	1.6	0.30	1.12	0.73	17.48	6.83
Petroleum	47.15	1.3	1.6	0.89	3.85	0.32	36.53	1.84
Machinery	17.88	1.3	1.6	1.60	27.91	0.49	91.44	0.96
Miscellaneous Ind.	6.69	1.3	1.6	2.38	38.93	1.14	129.16	2.27
Construction **(30.59)**				5.63				
Utility				2.81				
Trade Services				22.93				
Social Services				3.96				
Public Administration				2.69				
Financial Services				6.08				
Other Services **(47.09)**				11.44				
Total (100.00)	**15.33**			**100.00**	**100.00**	**100.00**	**8.41**	**5.04**

The import duty rates spread from 3 percent to as high as 47 percent. Most of the manufacturing activities are paying higher duties than the agriculture sectors. The import duty rate is highest for the petroleum sector (i.e. 47 %), followed by other food (37%), clothing (24%), chemical (21%) and machinery (18%) sectors. Lowest duties are paid by tobacco (2%), ready-made garments (2.9%) and rice milling (3.4%) sectors. The above tariff structure suggests that elimination tariff is likely to increase the imports volume of the heavily protected sectors. The structure of production reveals that contribution of agriculture, manufacturing and services activities in total value added are 22, 31 and

47 percent respectively. It is also noted that trade and other services sectors together account for about 34 percent of the total value added (please also see Appendix Table A1 for product and factor market details). Four sectors account for more then eighty percent of the total imports. These are miscellaneous industry (38.9%), machinery (27.9%), chemical (9.4%) and clothing (9%). Like imports, exports are also dominated by four sectors such as ready-made garments (60.8%), clothing (12.2%), leather (11%) and fish (7.7%), contributing more than 90 percent of export trade. Import volumes as percent of sectoral output are also found to be larger for heavily protected sectors such as miscellaneous industry (129%), machinery (91%), chemical (64%) and petroleum (37%). Almost 95 percent of the outputs of the ready-made garments are being used to meet export demand. The corresponding proportions for leather, fish and clothing sectors are 53, 16 and 13 percent respectively. The above analysis envisages that impacts of tariff elimination on the economy is likely to be channeled by these few sectors through altering their import volumes, demand for primary factors, and value added.

Simulation Design

Three simulations were conducted to analyze the impacts of trade reforms in the context of Bangladesh.

Simulation 1: In the first simulation existing tariffs are completely eliminated and resultant reduction in government revenues are mobilized by enhancing (i.e. by 55 percent) the existing production taxes and imposing new taxes on construction sector such that pre-simulation budgetary position of the government is retained. The base values of all other parameters are retained.

Simulation 2: In the second simulation existing tariffs are completely removed and resultant reduction in government revenues are generated by increasing (i.e. by almost 300 percent) the income tax rates of existing three household groups (e.g. non-farm, medium-skilled and professional) and levying income taxes on large farmer household such that pre-simulation budgetary position of the government is retained. The base values of all other parameters are retained.

Simulation 3: In the third simulation, tariff rates are rationalized in a way that conforms the tariff reforms steps undertaken in the country. It entailed decline of both spread and effective average duty rates such that mean rates and variance are reduced. The implied loss in revenue is mobilized by imposing news taxes on construction sector. The base values of all other parameters are retained (please see Appendix Table A1).

5. Simulation Outcomes

Simulation outcomes are reported under price, volumes, income, consumption and welfare impacts. These are discussed below.

Price and Volume Effects: The tariff elimination affects the domestic price of import first. The changes in domestic import price then influence the other prices, allocation of resources, incomes and consumption expenditures. The prices and volume effects of tariff elimination are presented in Table 14.

Table 14: Effects of Trade Liberalization on Sectoral Prices and Volumes

		Simulation 1								Simulation 2								Simulation 3							
Sectors	Tm	∂PM_i	∂M_i	∂PD_i	∂D_i	∂PE_i	∂E_i	∂P_i	∂Q_i	∂PM_i	∂M_i	∂PD_i	∂D_i	∂PE_i	∂E_i	∂P_i	∂Q_i	∂PM_i	∂M_i	∂PD_i	∂D_i	∂PE_i	∂E_i	∂P_i	∂Q_i
Aman Paddy				-10.298	-0.436			-10.298	-0.436			-11.032	-1.42			-11.032	-1.42			-1.502	0.428			-1.502	0.428
Boro Paddy				-10.319	-0.336			-10.319	-0.336			-11.257	-1.324			-11.257	-1.324			-1.713	0.495			-1.713	0.495
Grains	16.51	-14.168	6.475	-10.286	-1.674			-11.434	0.632	-14.168	4.514	-11.235	-1.619			-12.097	0.123	-7.731	0.284	-1.729	1.542			-3.525	1.782
Commercial crops	7.18	-6.695	-6.709	-10.231	0.008	-3.968	12.916	-10.024	-0.405	-6.695	-7.963	-10.999	0.202	-4.316	14.15	-10.748	-0.303	0.303	2.448	-1.449	0.695	-0.689	2.096	-1.344	0.503
Livestock			-16.98	-10.231	0.822	-4.13	13.49	-10.05	0.456		-19.888	-10.999	-1.192	-4.036	13.156	-10.806	-1.577		2.097	-1.540	0.676	-0.720	2.191	-1.510	0.622
Fish				-11.565	0.931	-4.689	15.496	-11.565	0.931			-12.651	-0.625	-4.821	15.979	-12.651	-0.625			-1.803	0.489	-0.781	2.380	-1.803	0.489
Forestry				-10.531	-2.392			-10.531	-2.392			-11.175	2.917			-11.175	2.917			-1.549	0.410			-1.549	0.410
Rice Milling	3.43	-3.317	-11.116	-10.119	-0.113	-3.619	18.971	-10.107	-0.133	-3.317	-14.078	-11.101	-1.728	-3.646	11.787	-11.088	-1.751	3.934	8.029	-1.531	0.267	-0.593	1.799	-1.521	0.251
Ata and Flour	12.16	-10.844	0.673	-10.843	0.672			-10.843	0.672	-10.844	-1.314	-11.64	-0.246			-11.638	-0.248	-4.158	3.181	-2.602	1.207			-2.605	1.211
Other Food	37.42	-27.228	26.742	-9.619	-2.28	-3.45	5.777	-11.856	0.704	-27.228	22.285	-12.37	-2.153	-4.765	8.124	-14.228	0.396	16.196	0.360	-2.031	0.208	-0.802	1.297	-3.776	1.967
Leather			-12.197	-13.198	4.057	-7.213	12.725	-12.971	3.732		-17.071	-16.033	2.276	-7.958	14.189	-15.763	1.883	15.190	6.947	-2.443	1.379	-1.537	2.509	-2.145	1.008
Clothing	24.42	-19.624	20.736	-10.123	4.413	-6.08	10.558	-11.969	7.268	-19.624	18.446	-12.515	6.089	-7.718	13.714	-13.877	8.275	-7.415	8.755	-2.118	1.167	-1.351	2.200	-3.118	2.526
Ready Made Garment	2.96	-2.873	-9.574	-16.002	9.216	-10.288	18.971	-13.451	5.051	-2.873	-13.578	-18.824	9.121	-11.625	21.863	-15.78	4.023	11.881	4.215	-2.488	2.570	-1.985	3.259	0.315	1.140
Tobacco	2.04	-1.999	-2.851	18.133	-23.801	18.343	-23.623	18.044	-23.726	-1.999	-13.813	-10.813	-2.579	-4.141	7.001	-10.781	-2.625	12.858	5.905	-1.043	0.233	-0.389	0.625	-0.993	0.298
Chemical	20.98	-17.345	9.026	-3.376	-11.004	2.512	-3.891	-9.487	-3.115	-17.345	7.063	-12.558	-0.493	-5.678	9.804	-14.576	2.574	-8.699	6.279	-2.777	2.060	-0.543	0.875	-5.280	1.318
Fertilizer	0.08	-0.084	-10.954	-9.541	1.333	-4.831	8.245	-8.126	-0.691	-0.084	-13.992	-12.809	2.671	-6.81	11.947	-10.944	-0.115	10.367	2.319	-2.813	3.444	-2.417	3.992	-0.872	0.818
Petroleum	47.15	-32.044	33.602	-3.109	-15.752	4.598	-6.94	-13.966	-1.677	-32.044	27.095	-12.609	-8.354	-2.988	4.973	-19.603	2.143	24.936	8.228	-3.050	8.054	1.518	2.382	10.940	2.673
Machinery	17.88	-15.169	2.794	-4.518	-12.893	2.474	-3.834	-10.027	-5.336	-15.169	7.566	-12.644	3.238	-7.105	12.516	-13.911	5.371	-6.296	1.768	-3.180	2.787	-0.564	0.910	-4.745	0.544
Miscellaneous Ind.	6.69	-6.269	-4.144	-6.807	-3.368	-2.125	3.497	-6.5	-3.813	-6.269	-3.657	-11.05	3.669	-6.448	11.254	-8.353	-0.576	7.940	7.156	-0.815	4.517	-1.837	3.011	4.075	2.293
Construction				1.327	-3.92			1.327	-3.92			-11.234	7.032			-11.234	7.032			1.694	1.471			1.694	1.471
Utility				-4.696	-3.569			-4.696	-3.569			-11.33	1.155			-11.33	1.155			-1.842	0.918			-1.842	0.918
Trade Services				-10.451	-0.968			-10.451	-0.968			-11.468	0.115			-11.468	0.115			-1.717	0.620			-1.717	0.620
Social Services				-10.192	0.023			-10.192	0.023			-11.126	-1.756			-11.126	-1.756			-1.485	0.097			-1.485	0.097
Public Administration				-9.15	-0.688			-9.15	-0.688			-11.096	0.458			-11.096	0.458			-1.005	0.310			-1.005	0.310
Financial Services				-9.909	-1.132			-9.909	-1.132			-11.091	-2.274			-11.091	-2.274			-1.373	0.175			-1.373	0.175
Other Services				-9.866	-0.522			-9.866	-0.522			-11.017	-2.944			-11.017	-2.944			-1.335	0.270			-1.335	0.270

It is expected that as a result of tariff elimination, the domestic price of import would decline and hence import volume may increase. A review of import price under *simulation 1* indicates that due to tariff elimination, domestic import prices have reduced for all imported commodities. The rates of reduction are also higher for products on which the import duty rates were higher. Reductions of domestic price of imports do not necessarily increase import volumes, rather import volume changes depend on the relative weight of import prices to domestic prices. It is also observed that, in the case of heavily protected sectors, fall in import prices were relatively larger than the fall of domestic price of domestic sales leading to higher demand for imports and lower demand for domestic products. The changes in import volumes however do not show a one to one correspondence between import price reduction and import volume rise. This correspondence is observed for petroleum (i.e. price fall was –33.0%, and import rise was 33.6%), chemical (i.e. price fall was –17.4%, and import rise was 9.0%), clothing (i.e. price fall was –19.6%, and import rise was 20.7%), other food (i.e. price fall was –27.2%, and import rise was 26.7%), grains (i.e. price fall was –14.2%, and import rise was 6.5%), and machinery (i.e. price fall was –15.2%, and import rise was 2.8%) etc. In the case of other imports, volume of imports declined despite import price reduction suggesting counter-intuitive outcomes. A review of relative prices of domestic sales and imported commodities answer the apparent counter-intuitive outcomes. For instances, in the case of ready made garments import price fall was 2.9 percent and domestic price fall was 16 percent leading a increased demand for domestic products (movement of factors in those sectors also ensured higher supply) and a reduced demand for imported substitutes. This pattern holds for all imported commodities that have registered fall in import demand even with complete elimination of tariff. The relationship between domestic price of imports and import volume as observed in the first simulation is also found in the case of *second simulation*, even though the magnitudes of changes are somewhat different. In the *third simulation*, tariff rates were rationalized such that new rates are higher for some consumer goods (such as rice milting, other food, clothing, ready made garments and miscellaneous products) and a few intermediate goods (e.g. commercial crops, petroleum and fertilizer) compared to the base case resulting in rise of domestic prices of these imports and consequent substantial fall in their import volumes. The new rates however were lower for other imported products compared to their base values envisaging a reduction of domestic price of imports of these products and rise in their import volumes.

Decline of export prices led to positive growth of Bangladeshi exports. *In simulation 1*, highest export growth is observed for ready-made garments (18.9%, where export price fell by 10.3%), fish (15.5%, where export price fell by 4.7%), livestock (13.5% where export price fell by 4.1%), commercial crops (13.5%, where export price fell by 3.9%), and leather (12.7%, where export price fell by 7.2%). Growth of exports was negative for tobacco (-23.6% where export price rose by 18.3%) and chemical (-3.9%, where export price fell by 2.5%) and miscellaneous industries (3.8%, where export price fell by 2.5%) due to export price fall. In the case of *second simulation* export price of all export commodities have fallen leading to rise in export volume. Large price fall is observed for ready-made garments with corresponding highest growth export for that sector. On the other hand, lowest price fall (i.e. 2.9%) and lowest growth (4%) is observed for the petroleum sector. Similar trends in exports growth and export price fall as found in the case of simulation 1 were also observed under *third simulation*. Since the magnitude of export price movements were smaller in the second simulation changes in export volumes are relatively smaller in this case compared to the first simulation.

In the *first and second simulations* decline of domestic import price and domestic sales prices resulted in the fall composite price of all products, which may lead to a rise in the consumption of all products. However due to decline of nominal income, households have not been able to take advantage of price fall and as a result consumption of most products reduced and a few increased (e.g. other food, leather products, clothing and ready-made garments etc.). Reduction of domestic import prices and domestic sales prices led to the decline of composite prices of all commodities and increase in the demand of composite commodities under the *third simulation*.

Factor Movements and Impacts on Value added: Movements of primary factors and the corresponding changes in value added by sectors are reported in
Table 15.

Table 15: Factor Movements and Value Added by Sectors

				Simulation 1			Simulation 2			Simulation 3		
	L_i / K_i	wL_i / wL	rK_i / rK	∂KD_i	∂LD_i	∂VA_i	∂KD_i	∂LD_i	∂VA_i	∂KD_i	∂LD_i	∂VA_i
Aman Paddy	1.614	5.197	2.779	0.11	-0.24	-0.11	-1.76	-1.78	-1.78	0.30	0.05	0.14
Boro Paddy	1.293	5.410	3.610	0.18	-0.17	-0.02	-2.04	-2.05	-2.05	0.04	-0.21	-0.10
Grains	1.488	0.484	0.281	-1.11	-1.18	-1.16	-2.30	-2.11	-2.19	-2.01	-2.21	-2.13
Commercial crops	0.527	3.185	5.218	0.71	-0.02	0.45	0.02	-0.28	-0.09	0.66	0.34	0.55
Livestock	1.135	5.142	3.908	1.52	-0.03	0.68	-1.45	-2.32	-1.92	0.49	0.05	0.25
Fish	0.096	0.409	3.678	3.45	2.28	3.40	1.17	1.07	1.16	0.44	0.13	0.41
Forestry	0.345	1.483	3.712	-2.24	-2.05	-2.19	2.31	2.69	2.41	-0.61	-0.77	-0.65
Rice Milling	0.045	0.567	10.812	0.74	-0.19	0.70	-2.18	-2.55	-2.20	0.09	-0.26	0.08
Ata and Flour	0.047	0.048	0.886	0.30	0.41	0.31	-1.61	-1.23	-1.59	-0.61	-0.79	-0.62
Other Food	0.189	0.574	2.617	-1.28	-1.24	-1.28	-2.83	-2.50	-2.78	-0.87	-1.07	-0.91
Leather	0.246	0.267	0.936	9.54	9.65	9.56	7.38	7.81	7.46	1.15	0.96	1.11
Clothing	1.080	4.355	3.481	5.38	5.27	5.32	5.24	5.49	5.37	0.38	0.16	0.26
Ready Made Garment	0.804	2.883	3.094	18.47	14.93	16.87	18.85	16.60	17.84	2.29	1.61	1.99
Tobacco	*0.355*	*0.360*	*0.876*	-22.92	-23.39	-23.04	-2.54	-2.70	-2.60	0.33	0.03	0.26
Chemical	*1.650*	*0.806*	*0.422*	-9.29	-9.51	-9.52	-3.19	-2.94	-3.03	-4.03	-4.25	-4.17
Fertilizer	0.844	0.295	0.302	4.29	4.18	4.21	0.63	1.02	0.81	1.33	1.12	1.23
Petroleum	*0.108*	*0.187*	*1.499*	-15.52	-15.38	-15.51	-10.53	-10.19	-10.50	-10.10	-10.25	-10.11
Machinery	*0.334*	*0.864*	*2.229*	-11.63	-11.54	-11.61	0.28	0.69	0.39	-5.31	-5.49	-5.35
Miscellaneous Ind.	0.654	2.032	2.683	-0.93	-1.28	-1.07	3.65	3.68	3.66	5.40	5.13	5.30
Construction	0.456	3.806	7.197	-2.62	-2.54	-2.59	6.30	6.66	6.41	-1.38	-1.56	-1.44
Utility	0.224	1.110	4.284	-3.03	-3.14	-3.05	0.30	0.73	0.38	0.26	0.04	0.22
Trade Services	3.643	38.839	9.200	-0.72	-0.63	-0.65	-0.97	-0.61	-0.68	0.16	-0.02	0.02
Social Services	1.039	4.352	3.614	0.73	0.09	0.40	-2.25	-2.12	-2.19	0.00	-0.28	-0.15
Public Administration	4.248	4.698	0.954	1.64	1.393	1.44	0.03	0.35	0.28	0.94	0.70	0.74
Financial Services	0.345	3.366	8.427	-0.55	-0.69	-0.59	-2.71	-2.30	-2.60	0.24	0.01	0.18
Other Services	0.602	9.282	13.299	0.67	-0.04	0.43	-3.26	-3.40	-3.31	0.39	0.09	0.28
Total		100.000	100.000									

In *all simulations*, as expected due to complete elimination of tariff along with increase of consumption taxes, resources moved from protected sectors to un-protected and less taxed sectors. It is observed that both the labour and capital factors are released from the heavily protected-taxed sectors (i.e. petroleum, chemical, other food and machinery sectors) to relatively less protected (i.e. ready-made garments and commercial crops) or un-protected sectors (i.e. leather, fish and livestock). As a result of the factor movements, value added of the heavy protected-taxed sectors declined and the value added of less protected and un-protected sectors increased. Even though clothing was a heavily protected sector, value added of this sector expanded mainly to meet increased input demand of the expanding ready-made garments sector.

It is important to note that due to tariff elimination and rationalization composite as well as general price indices registered decline[20]. The fall in the general price level has induced subsequent reduction in the nominal wage and rental rate of capital. As a result, the sectoral nominal income reduced under both cases compared to the base scenario[21] (see Appendix table A3). Fall in the sectoral nominal incomes have been manifested as reduced nominal income by the seven household groups.

Income Effects: Initial distribution of household's income from wages, capital and other sources (e.g. remittances, and transfers) are presented in Table 16. It also shows the post-simulation changes in household income by the above-mentioned three categories.

Table 16: Income Profiles of Household Groups

		Simulation 1												
		Income share %							*Income Change*					
	Change	LAB	Small	Large	NFHH	WLSKL	WSKL	PROF	LAB	Small	Large	NFHH	WLSKL	WSKL	PROF
Wage	-9.558	100.00	56.96	32.25	55.59	60.74	26.11	27.35	-10.428	-10.244	-10.40	-9.955	-10.174	-7.521	-8.704
Capital	-10.579	0.00	42.21	66.50	41.87	37.35	63.63	67.01	0.000	-10.620	-10.428	-10.631	-10.626	-10.623	-10.595
Other Income	0.000	0.00	0.83	1.26	2.53	1.91	10.26	5.63	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	-10.122	100.00	100.00	100.00	100.00	100.00	100.00	100.00	-10.428	-10.403	-10.412	-10.238	-10.343	-9.495	-9.971
Change in Direct Taxes									0.000	0.000	0.000	11.11	0.000	10.61	11.11
Net Change in Nominal Income									-10.428	-10.403	-10.412	-10.236	-10.343	-9.493	-9.970
		Simulation 2												
		Income share %							*Income Change*					
	Change	LAB	Small	Large	NFHH	WLSKL	WSKL	PROF	LAB	Small	Large	NFHH	WLSKL	WSKL	PROF
Wage	-9.936	100.00	56.96	32.25	55.59	60.74	26.11	27.35	-10.803	-10.657	-10.427	-10.386	-10.543	-7.861	-9.205
Capital	-10.814	0.00	42.21	66.50	41.87	37.35	63.63	67.01	0	-10.821	-10.822	-10.825	-10.822	-10.825	-10.796
Other Income	0.000	0.00	0.83	1.26	2.53	1.91	10.26	5.63	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	-10.849	100.00	100.00	100.00	100.00	100.00	100.00	100.00	-10.803	-10.816	-10.826	-10.844	-10.855	-10.861	-10.884
Change in Direct Taxes									0.000	0.000	"-"	-72.0	0.00	-72.3	-75.6
Net Change in Nominal Income									-10.803	-10.816	-13.103	-12.394	-10.855	-16.343	-15.531
		Simulation 3												
		Income share %							*Income Change*					
	Change	LAB	Small	Large	NFHH	WLSKL	WSKL	PROF	LAB	Small	Large	NFHH	WLSKL	WSKL	PROF
Wage	-1.623	100.00	56.96	32.25	55.59	60.74	26.11	27.35	-1.248	-1.343	-1.451	-1.330	-1.391	-3.090	-2.228
Capital	-1.124	0.00	42.21	66.50	41.87	37.35	63.63	67.01	0.000	-1.304	-1.310	-1.127	-1.247	-0.834	-1.083
Other Income	0.000	0.00	0.83	1.26	2.53	1.91	10.26	5.63	0.00	0.000	0.000	0.000	0.000	0.000	0.000
Total	-1.305	100.00	100.00	100.00	100.00	100.00	100.00	100.00	-1.248	-1.316	-1.339	-1.212	-1.311	-1.348	-1.338
Change in Direct Taxes									0.000	0.000	0.000	1.52	0.000	1.21	1.27

[20] The decline was substantial in the first case and small in the second case.

[21] The real wage and real return capital were however positive implying that sectoral real income was higher under the tariff elimination simulation than the base case.

Net Change in Nominal Income	-1.248	-1.316	-1.339	-1.212	-1.311	-1.348	-1.338

Note: "-" indicates changes due to imposing of new tax.

It is observed that agriculture labour household receives income only from wages. Small farm and non-farm household groups generate more than 55 percent of their income from wage sources. On the other hand, large farm household received almost 67 percent of their income from return of capital. The factorial income distribution pattern of the rural household groups suggest that fall in wage income likely affect the poor household groups (i.e. labour, small and non-farm) than the rich household group. Analogously, the decline of capital income is likely to hurt the rich household group more than the poor household group. In the case of urban households, both the professional and skilled worker household groups generate more then 60 percent of their income from capital return. The low skilled household group receives only 38 percent of their income from capital return. Again the fall of capital income would have deleterious impacts on professional and skilled worker household groups (i.e. rich) than the low skilled household group (i.e. poor).

As a result of decline of nominal factor returns (of capital and labour), incomes from both wage and capital return registered sharp decline from the base values. The wage income and capital income reduced by 9.55 and 10.57 percent respectively leading to a fall of 10.12 percent of overall income under the *first simulation*. Since rates of direct taxes remained same, induced changes in direct taxes amount were small. Under *second simulation*, the wage income, capital income and total factor income reduced by 9.93, 10.81 and 10.85 percent respectively. The reduction of factorial income led to reduce incomes by the seven representative household groups. However, since rates of direct taxes were significantly raised for existing income tax paying household groups (i.e. non-farm, medium-skilled and professional) and imposed new tax on large farmer household group the resultant changes in direct tax amounts were significant leading substantial fall of net incomes of these four household groups (e.g. for Large-farmer: factor income –10.83%, net income -13.1%; Non-farm: factor income – 10.84%, net income -12.4%; Medium-skilled: factor income –10.82%, net income -16.3% and Professional: factor income –10.88%, -net income 15.5%). In the case of *third simulation*, fall of factor return were smaller than that of the first two simulations envisaging reduction of wage income and capital income respectively by 1.62 and 1.24 percent. As a result, overall income fell by 1.31 percent.

Consumption Effects: Consumption pattern of the seven representative household groups are presented in Table 17.

Table 17: Consumption Patterns by Household Groups

	Simulation 1		Simulation 2		Simulation 3		Consumption Share (%)						
	∂P_i	∂Q_i	∂P_i	∂Q_i	∂P_i	∂Q_i	Labour	Small	Large	NFHH	WLSKL	WMSKL	PROF
Aman Paddy	-10.298	-0.436	-11.032	-1.42	-1.502	0.428	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Boro Paddy	-10.319	-0.336	-11.257	-1.324	-1.713	0.495	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grains	-11.434	0.632	-12.097	0.123	-3.525	1.782	0.13	0.17	0.16	0.11	0.09	0.07	0.04
Commercial crops	-10.024	-0.405	-10.748	-0.303	-1.344	0.503	4.45	5.71	5.84	3.63	2.98	2.71	4.39
Livestock	-10.05	0.456	-10.806	-1.577	-1.510	0.622	2.59	3.24	5.07	3.64	5.06	6.67	6.78
Fish	-11.565	0.931	-12.651	-0.625	-1.803	0.489	3.62	4.60	4.54	3.85	3.35	3.20	2.15
Forestry	-10.531	-2.392	-11.175	2.917	-1.549	0.410	4.40	4.43	3.46	3.69	2.79	1.66	0.54
Rice Milling	-10.107	-0.133	-11.088	-1.751	-1.521	0.251	*47.46*	*30.12*	*14.99*	*33.26*	*28.39*	*18.89*	*7.22*
Ata and Flour	-10.843	0.672	-11.638	-0.248	-2.605	1.211	1.82	1.42	0.76	1.37	1.06	0.78	0.46
Other Food	-11.856	0.704	-14.228	0.396	-3.776	1.967	3.68	5.73	6.71	4.20	4.04	4.62	4.18
Leather	-12.971	3.732	-15.763	1.883	-2.145	1.008	0.31	0.75	0.94	0.71	0.69	1.12	1.68
Clothing	-11.969	7.268	-13.877	8.275	-3.118	2.526	4.81	5.77	6.09	5.41	5.44	5.67	4.88
Ready Made Garment	-13.451	5.051	-15.78	4.023	0.315	1.140	0.36	0.49	0.52	0.44	0.42	0.48	0.43
Tobacco	18.044	-23.726	-10.781	-2.625	-0.993	0.298	2.88	2.87	2.33	2.36	2.12	1.98	1.05
Chemical	-9.487	-3.115	-14.576	2.574	-5.280	1.318	1.01	1.05	1.01	1.10	1.26	1.00	0.53

Fertilizer	-8.126	-0.691	-10.944	-0.115	-0.872	0.818	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Petroleum	-13.966	-1.677	-19.603	2.143	10.940	2.673	0.32	0.32	0.25	0.42	1.05	1.10	0.63
Machinery	-10.027	-5.336	-13.911	5.371	-4.745	0.544	0.44	0.58	0.87	0.76	0.82	0.81	0.46
Miscellaneous Ind.	-6.5	-3.813	-8.353	-0.576	4.075	2.293	2.95	7.34	13.18	5.40	4.84	5.24	5.09
Construction	1.327	-3.92	-11.234	7.032	1.694	1.471	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Utility	-4.696	-3.569	-11.33	1.155	-1.842	0.918	0.44	0.58	0.49	0.66	1.57	2.10	1.94
Trade Services	-10.451	-0.968	-11.468	0.115	-1.717	0.620	2.63	*5.24*	*7.46*	*7.81*	*8.21*	*12.14*	*21.91*
Social Services	-10.192	0.023	-11.126	-1.756	-1.485	0.097	1.15	2.07	3.68	2.40	2.28	3.75	3.52
Public Administration	-9.15	-0.688	-11.096	0.458	-1.005	0.310	0.04	0.04	0.05	0.05	0.05	0.06	0.07
Financial Services	-9.909	-1.132	-11.091	-2.274	-1.373	0.175	6.18	*7.09*	*8.52*	*7.35*	*7.92*	*9.79*	*11.45*
Other Services	-9.866	-0.522	-11.017	-2.944	-1.335	0.270	8.32	*10.39*	*13.06*	*11.37*	*15.55*	*16.15*	*20.61*
Total							*100*	*100*	*100*	*100*	*100*	*100*	*100*

Except for the low skilled worker households all other poor household groups (i.e. agriculture labourer, small farm, non-farm) have been spending more than 50 percent of their disposable income on food items, especially on rice and wheat. On the other hand rich household groups have found to spend less or around 40 percent of their disposable income food items. They spend more than 40 percent of their disposable income on services. It is also observed that rich household groups spend more income on imported commodities than their poorer counter parts. The above consumption patterns of the household groups suggest following features:

(a) growth of food items benefit poor household groups more than the rich household groups and vice-versa;
(b) growth of various services likely to benefit the rich household groups compared to the poor household groups and vice-versa; and
(c) growth of imports are also likely to benefit the rich household groups more than their poor counter parts and vice-versa.

The review of growth of consumption of the products (i.e. food items and clothing) suggests that poorer households are relatively more benefited than their rich counter parts. A review of consumption growth of the seven representative household groups testifies the working of the above-mentioned transmission channels. For instance, in the case of *third simulation*, consumption growth of professional (0.23%) and large farm (0.05%) are found to be smaller than the poor household groups such as agriculture labour (0.32%), low skilled (0.33%) and non-farm (0.24%).

Welfare Effects: The concept of efficiency or welfare is the starting point for any policy analysis. Unlike a pure theoretical approach where only an ordinal measure of alternative states is examined, in applied policy analysis some measures of welfare are employed to compare movement from one state to another.

Therefore, in applied policy analysis, generally some monetary representations of individual utility functions are used. This is defined as the amount of money required to attain a level of utility at a reference price vector. This is termed as money metric, and its value is derived from the expenditure function. The expenditure function, which is the inverse of the indirect utility function, is a vital tool for welfare analysis and allows "measurement of utility". Since the value of expenditure function depends on the set of prices used, there are different money metrics one can use. The most widely used ones are compensating variation (CV) and equivalent variation (EV). These are generally used because they have easy interpretation in terms of the compensated demand curves. In the EV approach, the idea is to measure in money terms, how much income needs to be given to the consumer at the "pre-policy change" level of prices (P_0) in order to enable him to enjoy the utility level which arises after the policy change is effected ("post-policy change level of utility"). The CV comes from the opposite direction. It measures the change in "post-policy change" level of prices

(P_1) that brings the consumer to the "pre-policy change" level of utility[22]. In this exercise the Equivalent Variation is used as a measure of welfare to examine welfare impacts of simulations.

Table 18: Impacts on Welfare of Household Groups

Welfare Indicators	Household Groups						
	Rural				Urban		
Simulation 1	**Labour**	**Small**	**Large**	**Non-Farm**	**WLSKL**	**WMSKL**	**Professional**
Change in nominal income	-10.428	-10.403	-10.412	-10.236	-10.343	-9.493	-9.970
Change in consumer price index	-9.408	-9.332	-9.297	-9.503	-9.537	-9.568	-9.823
Equivalent variation	-0.87	-1.81	-2.29	-1.86	-1.29	0.46	-0.34
Simulation 2							
Change in nominal income	-10.803	-10.816	-13.103	-12.394	-10.855	-16.343	-15.531
Change in consumer price index	-11.417	-11.437	-11.326	-11.447	-11.505	-11.545	-11.480
Equivalent variation	0.67	1.55	-5.33	-3.68	1.76	-16.88	-25.06
Simulation 3							
Change in nominal income	-1.26	-1.31	-1.34	-1.29	-1.30	-1.23	-1.29
Change in consumer price index	-1.568	-1.389	-1.31	-1.480	-1.568	-1.562	-1.480
Equivalent variation	0.33	0.23	-0.45	0.68	0.55	0.79	0.95

The changes in nominal income and consumer price index (CPI) and the EV values are reported in Table 18. The changes in nominal income for each of the seven household groups are found to be negative. This is the reflection of reduced sectoral nominal wages and rental rate of capital, which manifested in fall of sectoral incomes. The nominal income decline is relatively higher for rural households groups compared to the urban groups. The decline in nominal income must be compared to the changed consumer price index to arrive at the net beneficiaries of the tariff elimination simulation. The changes in the consumer price index appear not to follow a systematic pattern and the outcome is a mixed one. Considering both the income and price effects, the welfare impacts are captured by EV measure. It is observed that, except for medium-skilled household, Equivalent Variations are negative for all household groups under *simulation one*. The negative EV values are the manifestation of negative consumption growth. The values of the EVs of rural households envisage relatively larger losses for the well-off groups (e.g. large farmer and non-farm) compared to the poor household groups (e.g. labour and small farmer). The pattern is however reverse in the case of urban group with the EV of poor household group (i.e. worker low skilled) fell more than that of urban rich household groups (e.g. medium-skilled and professional). It also appears that welfare losses are larger for rural household groups compared to their urban counter parts.

In the case of *second simulation* due to imposing of new income tax and enhancement of existing income tax rates, the income fall of four relatively rich households are substantially larger than the reduction of their respective CPIs leading to decline of their EVs. On the other hand, the EVs of other three poor household groups are found to be positive envisaging that pattern of welfare changes are progressive. This outcome also suggests that ensuring neutrality of government through income tax changes, rather than indirect tax alternation, is a desirable option.

[22] In a many consumer economy, the use of aggregate EV or CV as a measure of welfare changes, although avoiding any explicit Social Welfare Function (SWF), has an implicit SWF because of the adding up approach. Boadway and Bruce (1984) show that there are some well-known problems in interpreting the aggregate EVs or CVs and one needs to be careful in interpreting the result of such measures. Social ordering requires more data and judgment than do household ordering and it may not be possible to measure changes in welfare simply on the basis of household orderings of social status drawn from their market behaviour. When EV is used as a measure of welfare, it is implicitly assumed that aggregate market behaviour is generated by a single household whose preferences coincide with the social ordering.

In the case of *third simulation*, larger decline of CPI values outweighs nominal income fall leading a positive consumption growth and the EV values for each of the seven representative household groups. The values of the EVs envisage relatively larger gains for urban household groups compared to the rural household groups. For urban household groups the gains represent a clear regressive pattern. On the other hand, the gains of rural household groups do not provide a clear incidence pattern although it is tilted towards a progressive pattern.

- *It is observed that welfare losses are larger for rural household groups compared to their urban counter parts (e.g. first simulation). The patterns of losses are progressive for rural household groups but regressive for urban household groups.*
- *The patterns of welfare changes are progressive when neutrality of government revenue is ensured through increasing income tax (e.g. second simulation). Loses are large for rich household groups while gains are moderate for poor household groups.*
- *The main observations are that the welfare gains of tariff rationalization (e.g. third simulation) are moderate and accrue more to the urban household groups than the rural household groups. For urban household groups, a clear regressive pattern is observed but the pattern is ambiguous for the rural household groups.*

Poverty Incidence: Head-count ration of FGT measure of poverty has been used to evaluate the effects on poverty profiles of the rural and urban locations. The measurements of poverty profiles follow the method adopted by Decaluwe et al (1999). The methodology requires; (a) explicit proposition of income distribution formulation corresponding to each household group's characteristics and (b) postulation of an unique and constant basket of basic needs based poverty line whose monetary value is altered by endogenously determined commodity prices. Following this methodology the derivation of poverty profiles of the representative household groups are discussed below.

1. The income distribution formulation depends on the "minimum" and "maximum" incomes and on the skewness of the distribution. The "Beta" distribution function is used to represent these characteristics of the household groups. Implementation of "Beta" distribution requires minimum and maximum incomes within each of the household groups and values of shape and skewness parameters (i.e. p and q) of the distribution. The reported minimum and maximum incomes and estimates values of p and q parameters for rural and urban locations are reported in Table 19.

2. The derived distribution has been used to assess the poverty implication. It is assumed, following a policy change, that intra-group distributions shift proportionally due to mean income change envisaging constancy of intra-group distributions. That is if the mean income change by k factor, the income of each group within each household groups altered by k factor. Analogously, minimum and maximum income of each household group will also alter. Income effects of simulations are provided in Table 19.

3. The per capita incomes of each household group are contrasted with the poverty line to derive poverty profiles. Two poverty lines applicable for rural and urban locations have been defined to capture price and other characteristics. The poverty lines are determined by a basket of quantities of commodities reflecting basic needs. Although, the basket remains invariant under different simulations, commodity price changes alter the monetary values of poverty lines. Rise in commodity prices will shift the poverty line to the right (compared to the base case) and vice versa.

4. It is observed that in the base case, almost 53 percent of rural populations were poor while for urban areas it is around 28 percent. This suggests that the incidence of poverty in rural area is much higher than in urban area.

Table 19: Poverty Incidence by Location

	Income (Tk per capita per month)				Population	Beta		*Poverty Incidence*		
	Minimum	Maximum	Mean	Poverty Line	Share (%)	p	q	Head Count P_0	Gap P_1	Severity P_2
Rural										
Base	17.0	9140	697	650	78.65	2.9	37	53.454	19.679	9.9222
Simulation 1	15.2	8194	625	585	78.65	2.9	37	(0.461)	(0.671)	(0.816)
Simulation 2	15.2	8164	625	566	78.65	2.9	37	(-3.778)	(-4.746)	(-5.318)
Simulation 3	16.8	9021	670	637	78.65	2.9	37	(-0.591)	(-0.946)	(-1.164)
Urban										
Base	73.0	26533	1359	725	21.35	1.7	33	28.681	0.104814	0.0546391
Simulation 1	66.0	23898	1224	653	21.35	1.7	33	(1.074)	(3.902)	(4.284)
Simulation 2	66.0	23822	1220	631	21.33	1.7	33	(-4.312)	(-1.351)	(-1.611)
Simulation 3	72.0	26194.0	1342	716	21.33	1.7	33	(0.064)	(0.085)	(0.104)

Among others, due to tariff elimination and rationalization, the incomes of the representative household groups and the commodity prices are altered. The income and prices changes then also alter the minimum and maximum incomes within each household group and the monetary values of rural and urban poverty lines. The estimated post simulation values of the minimum and maximum incomes and the poverty lines are reported in Table 19. The changes in the values of minimum and maximum incomes and poverty lines are significantly different under the base and simulation scenario. These estimated income and price values are then incorporated the FGT formulation to derive the post simulation poverty profiles. The impacts are summarized below.

- Incidence of rural poverty as measured by the Head Count ratio increased by 0.5 percentage points than the base head count ratio under *simulation one*. It suggests that around 0.5 percent of the population would slip into poverty as a result of the complete elimination of tariff with consequent adjustment of production taxes. Rural poverty reduced quite substantially (i.e. 3.8%) in the case of *second simulation*. This is due to the positive consumption/welfare growth of two rural household groups (i.e. labour and small farmer) who constitute major part of rural household. Rural poverty situation also improved under the *third simulation* (e.g. head-count dropped by 0.59 percent) due to consumption growth of majority of rural household groups. Other two measures of the poverty (i.e. poverty gap and severity) suggest that poverty situation of the rural poor may have also improved (i.e. second and third simulations). The poverty pap and severity values decreased by (i.e. 4.7 and 5.3; 0.95 and 1.16 percentage points under simulations 1 and 2 respectively) implying that the poverty situations of the population who still remained poor have improved as result of tariff-tax reforms.

- On the other hand, urban poverty is observed to deteriorate under first and third simulations. However, deterioration was higher under the *first simulation* than the third one. The head count ratio, gap and severity increased by 1.0, 3.9 and 4.2 percentage points compared to their base values. The corresponding estimates under the *third simulation* were 0.064, 0.085 and 0.104 respectively. These results suggest that not only some of the poor population have been slipped from non-poor to poor categories, the population who still remained poor their situation have also deteriorated (as indicated by gap and severity). On the other hand, due to consumption growth of low skilled household, who accounts for 70% of urban household, urban poverty is reduced by 4.3 percent. Reduction of gap (1.4%) and severity (1.6%) also suggests improvement of poverty situation of those who are still poor.

The prime observation is that rural poverty as measured by head count ratio is observed to decline due to tariff-income tax reforms (i.e. simulation 2) and tariff rationalization (i.e. simulation 3), the gap and severity of rural poor have improved indicating a better poverty profiles for the rural poor. Poverty situation worsened in the case of tariff-production tax reforms (i.e. simulation 1). The gap

and severity of rural poor increased indicating a worsening of poverty profiles for the rural poor household group.

Urban poverty situation has worsened (i.e. first and third simulations). Gap and severity of urban poor population have also increased envisaging that the benefits of tariff rationalization accrue more to the urban rich household groups compared to their poorer counter parts. Under second simulation, urban poverty has improved and the improvement in gap and severity suggest a better poverty profiles for urban poor.

6. Concluding Observations

Three simulations were conducted to assess welfare and poverty the impacts of tariff reforms on the 7 representative household groups. EV measures welfare impacts and poverty implications are assessed by FGT measures of poverty. Main observations are summarized:

Welfare Effects: It is observed that welfare losses are larger for rural household groups compared to their urban counter parts (e.g. first simulation). The patterns of losses are progressive for rural household groups but regressive for urban household groups.

The patterns of welfare changes are progressive when neutrality of government revenue is ensured through increasing income tax (e.g. second simulation). Loses are large for rich household groups while gains are moderate for poor household groups.

The main observations are that the welfare gains of tariff rationalization (e.g. third simulation) are moderate and accrue more to the urban household groups than the rural household groups. For urban household groups, a clear regressive pattern is observed but the pattern is ambiguous for the rural household groups.

Poverty Incidence: The prime observation is that rural poverty as measured by head count ratio is observed to decline due to tariff-income tax reforms (i.e. simulation 2) and tariff rationalization (i.e. simulation 3), the gap and severity of rural poor have improved indicating a better poverty profiles for the rural poor. Poverty situation worsened in the case of tariff-production tax reforms (i.e. simulation 1). The gap and severity of rural poor increased indicating a worsening of poverty profiles for the rural household group.

Urban poverty situation has worsened (i.e. first and third simulations). Gap and severity of urban poor population have also increased envisaging that the benefits of tariff rationalization accrue more to the urban rich household groups compared to their poorer counter parts. Under second simulation, urban poverty has improved and the improvement in gap and severity suggest a better poverty profiles for urban poor.

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Appendix I: Model Specification

	Equation	Description
	Price Block	
1.	$PM_i = \overline{PWM_i} \cdot ER \cdot (1 + tm_i + tv_i)$	Import Price
2.	$PM_i = PWE_i \cdot ER$	Export Price
3.	$P_i \cdot Q_i = PD_i \cdot D_i + PM_i \cdot M_i$	Composite Price
4.	$PX_i \cdot X_i = PD_i \cdot (1 - td_i - tv_i) \cdot D_i + PE_i \cdot E_i$	Activity Price
5.	$PN_i = \sum_j \tau_{ji} \cdot P_j$	Input price
6.	$PV_i \cdot V_i = PX_i \cdot X_i - PN_i \cdot INT_i$	Value added price
7.	$PK_i = \sum_j \kappa_{ij} \cdot P_j$	Capital Price
	Production and Supply Block	
8.	$X_i = AX_i \cdot [\eta_i \cdot V_i^{-\phi_i} + (1 - \eta_i) \cdot N_i^{-\phi_i}]^{-1/\phi_i}$	Gross Output (CES aggregate of value-added and intermediate input)
9.	$N_i = V_i \cdot [\frac{PD_i \cdot (1 - \eta_i)}{PM_i \cdot \eta_i}]^{\frac{1}{1+\phi_i}}$	Composite Intermediate
10.	$V_i = AV_i \cdot [\sum_f \alpha_{if} \cdot FD_{if}^{-\mu_i}]^{-\frac{1}{\mu_i}}$	Value added function
11.	$FD_{if} = V_i \cdot \left[\frac{\alpha_{if} \cdot PV_i}{AV_i^{\mu_i} \cdot W_f \cdot \varpi_{if}}\right]^{\frac{1}{1+\mu_i}}$	Factor Demand
12.	$FY_f = \sum_i W_f \cdot \varpi_{if} \cdot FD_{if}$	Factor Income
13.	$Q_i = AQ_i \cdot [\delta_i \cdot M_i^{-\rho_i} + (1 - \delta_i) \cdot D_i^{-\rho_i}]^{-1/\rho_i}$	Composite Supply (Armington Function)
14.	$M_i = D_i \cdot [\frac{PD_i \cdot \delta_i}{PM_i \cdot (1 - \delta_i)}]^{\frac{1}{1+\sigma_i}}$	Import-Domestic Demand Ratio
15.	$Q_i = M_i + D_i$	Composite commodity aggregation for perfect substitutes
16.	$Q_i = D_i$	Composite supply for Non-imported commodities
17.	$Q_i = M_i$	Composite supply for Non-produced imports
18.	$X_i = AT_i \cdot [\gamma_i \cdot E_i^{-\phi_i} + (1 - \gamma_i) \cdot D_i^{-\phi_i}]^{1/\phi_i}$	Composite supply function
19.	$E_i = D_i \cdot [\frac{PE_i \cdot (1 - \gamma_i)}{PD_i \cdot (1 - td_i)}]^{\varphi_i}$	Export Supply
20.	$E_i = E_i^0 \cdot \left[\frac{PWE_i}{\overline{PWSE_i}}\right]^{\eta_i}$	Export Demand
	Institutional Income	
21.	$YF_h = \sum_f \varepsilon_{h,f} \cdot FY_f$	Household Factor Income

	Equation	Description
22.	$Y_h = \left[YF_h + \overline{RM_h}\right] \cdot (1 - th_h - s_h)$	Household Income
23.	$YG = \sum_h th_h \cdot Y_h + \sum_i tm_i \cdot \overline{PWM_i} \cdot M_i \cdot ER + \sum_i td_i \cdot X_i \cdot PD_i$	Government Income
24.	$CD_{ih} \cdot P_i = \beta_{ih} \cdot Y_h$	Consumption Demand
25.	$\overline{GD_i} = \beta_i^g \cdot \overline{GTOT}$	Government Demand
26.	$PK_i \cdot DK_i = \xi_i \cdot I$	Investment by Destination
27.	$ID_i = \sum_j \kappa_{ij} \cdot DK_j$	Investment by Origin
28.	$INT_i = \sum_j \tau_{ij} \cdot N_j$	Intermediate Demand
	Equilibrium Condition	
29.	$S = \sum_h SH_h + SG + SF$	Total Savings by Institutions
30.	$Q_i = INT_i + \sum_h CD_{ih} + GD_i + ID_i$	Product Market Balance: Supply equals Demand
31.	$\sum_i FD_{if} = FS_f$	Factor Market Balance: Demand equals Supply
32.	$\sum_i \overline{PWM_i} \cdot M_i - \sum_i PWE_i \cdot E_i - \sum_h \overline{RM_h} - SF = 0$	Current Account Balance: Receipts equal to Outlays
33.	$I = S = \sum_h SH_h + SG + SF$	Macro Balance: Investment equals Savings

Table A1: Tariff Rates Under Various Simulations

Sectors	Base Rate	Simulation 1	Simulation 1	Simulation 2
Grains	0.165	0.00	0.00	0.075
Commercial crop	0.072	0.00	0.00	0.075
Rice Milling	0.034	0.00	0.00	0.075
Ata Milling	0.122	0.00	0.00	0.075
Other Food	0.374	0.00	0.00	0.1519
Tobacco	0.020	0.00	0.00	0.1519
Clothing	0.244	0.00	0.00	0.1519
Ready Made Garment	0.030	0.00	0.00	0.1519
Chemical	0.210	0.00	0.00	0.1046
Fertilizer	0.001	0.00	0.00	0.1046
Petroleum Product	0.472	0.00	0.00	0.1046
Machinery	0.179	0.00	0.00	0.1046
Miscellaneous Industry	0.067	0.00	0.00	0.1046
Adjustment in Indirect Tax Rate		***55 percent (existing sectors) & Construction sector by 11%***		***Construction sector by 3%***
Adjustment in Direct Tax Rate			Non-farm: 2.7 (300%) Large farmer: 2.7 WMSL: 2.7 (300%) Professional: 2.7(300%)	
Average	*0.153*			*0.11*
Maximum	*0.472*			*0.152*
Minimum	*0.001*			*0.075*
Standard Deviation	*0.144*			*0.032*
Variance	*0.021*			*0.001*

Note: direct tax rates refers to rates based on total personal income bases and not taxable income base which is substantially lower than the base of personal income due to various types of exemption, deduction, credit etc. known as "tax loop holes". Figures in parentheses denote increase in rates over the base values.

Table A2: Production and Factor Market

	Gross output	Share %	VAL/GO	VAL Share %	Capital Share	Labour Share	Total
Aman Paddy	100.9	3.34	59.7	3.90	38.26	61.74	100.00
Boro Paddy	127.1	4.20	54.0	4.44	43.61	56.39	100.00
Grains	12.1	0.40	47.7	0.38	40.19	59.81	100.00
Commercial crops	125.0	4.13	52.8	4.28	65.50	34.50	100.00
Livestock	117.9	3.90	58.7	4.48	46.83	53.17	100.00
Fish	75.6	2.50	44.2	2.16	91.24	8.76	100.00
Forestry	81.6	2.70	50.7	2.68	74.36	25.64	100.00
Rice Milling	321.7	10.64	29.1	6.07	95.67	4.33	100.00
Ata and Flour	23.6	0.78	32.6	0.50	95.52	4.48	100.00
Other Food	95.0	3.14	27.1	1.67	84.09	15.91	100.00
Leather	31.5	1.04	30.7	0.63	80.25	19.75	100.00
Clothing	142.8	4.72	42.0	3.89	48.09	51.91	100.00
Ready Made Garment	98.0	3.24	47.2	3.00	55.43	44.57	100.00
Tobacco	20.1	0.67	48.8	0.64	73.82	26.18	100.00
Chemical	37.3	1.23	24.8	0.60	37.73	62.27	100.00
Fertilizer	16.3	0.54	28.4	0.30	54.24	45.76	100.00
Petroleum	26.8	0.89	51.4	0.89	90.26	9.74	100.00
Machinery	77.6	2.57	31.8	1.60	74.94	25.06	100.00
Miscellaneous Ind.	76.7	2.53	48.0	2.38	60.48	39.52	100.00
Construction	234.1	7.74	37.1	5.63	68.66	31.34	100.00
Utility	54.6	1.80	79.7	2.81	81.72	18.28	100.00
Trade Services	571.1	18.88	62.0	22.93	21.54	78.46	100.00
Social Services	83.3	2.75	73.4	3.96	49.04	50.96	100.00
Public Administration	59.5	1.97	69.8	2.69	19.05	80.95	100.00
Financial Services	166.7	5.51	56.4	6.08	74.36	25.64	100.00
Other Services	248.1	8.20	71.2	11.44	62.41	37.59	100.00
Total	**3024.9**	**100.00**		**100.00**	**53.68**	**46.32**	**100.00**

	Factor Share (%)	
	Labour	Capital
Aman Paddy	5.20	2.78
Boro Paddy	5.41	3.61
Grains	0.48	0.28
Commercial crops	3.19	5.22
Livestock	5.14	3.91
Fish	0.41	3.68
Forestry	1.48	3.71
Rice Milling	0.57	10.81
Ata and Flour	0.05	0.89
Other Food	0.57	2.62
Leather	0.27	0.94
Clothing	4.35	3.48
Ready Made Garment	2.88	3.09
Tobacco	0.36	0.88
Chemical	0.81	0.42
Fertilizer	0.30	0.30
Petroleum	0.19	1.50
Machinery	0.86	2.23
Miscellaneous Ind.	2.03	2.68
Construction	3.81	7.20
Utility	1.11	4.28
Trade Services	38.84	9.20
Social Services	4.35	3.61
Public Administration	4.70	0.95
Financial Services	3.37	8.43
Other Services	9.28	13.30
Total	100.00	100.00

Table A3: Factor Returns and Factor Income by Sectors

	Simulation 1				Simulation 2				Simulation 3			
	∂PVA_i	∂FY_i	∂r_i	∂w_i	∂PVA_i	∂FY_i	∂r_i	∂w_i	∂PVA_i	∂FY_i	∂r_i	∂w_i
Aman Paddy	-10.49	-10.59	-10.53	-10.63	-10.82	-12.40	-12.40	-12.40	-1.315	-1.18	-1.12	-1.21
Boro Paddy	-10.51	-10.53	-10.47	-10.57	-10.82	-12.65	-12.65	-12.65	-1.324	-1.42	-1.38	-1.46
Grains	-10.60	-11.63	-11.62	-11.63	-10.89	-12.84	-12.87	-12.81	-1.337	-3.43	-3.39	-3.46
Commercial crops	-10.47	-10.07	-9.99	-10.22	-10.76	-10.84	-10.81	-10.90	-1.346	-0.81	-0.77	-0.87
Livestock	-10.13	-9.52	-9.27	-9.74	-10.54	-12.26	-12.12	-12.38	-1.262	-1.01	-0.93	-1.08
Fish	-10.59	-7.56	-7.54	-7.72	-10.82	-9.79	-9.78	-9.84	-1.398	-0.99	-0.98	-1.09
Forestry	-10.65	-12.61	-12.62	-12.56	-10.88	-8.74	-8.76	-8.64	-1.389	-2.03	-2.02	-2.06
Rice Milling	-10.60	-9.98	-9.97	-10.24	-10.82	-12.78	-12.77	-12.88	-1.406	-1.33	-1.33	-1.43
Ata and Flour	-10.63	-10.35	-10.35	-10.14	-10.84	-12.26	-12.26	-12.17	-1.411	-2.03	-2.03	-2.03
Other Food	-10.63	-11.77	-11.77	-11.74	-10.86	-13.34	-13.35	-13.25	-1.396	-2.29	-2.28	-2.34
Leather	-10.64	-2.09	-2.10	-1.99	-10.87	-4.22	-4.24	-4.09	-1.392	-0.29	-0.28	-0.31
Clothing	-10.59	-5.83	-5.82	-5.85	-10.90	-6.12	-6.16	-6.08	-1.342	-1.08	-1.05	-1.12
Ready Made Garment	-9.82	5.40	5.88	4.81	-10.32	5.68	5.98	5.30	-1.222	0.74	0.84	0.62
Tobacco	-10.53	-31.14	-31.11	-31.26	-10.80	-13.12	-13.11	-13.17	-1.364	-1.12	-1.09	-1.20
Chemical	-10.53	-18.97	-18.92	-19.00	-10.92	-13.63	-13.67	-13.59	-1.322	-5.43	-5.38	-5.46
Fertilizer	-10.61	-6.84	-6.84	-6.82	-10.93	-10.21	-10.26	-10.13	-1.353	-0.13	-0.12	-0.14
Petroleum	-10.63	-24.50	-24.50	-24.46	-10.85	-20.21	-20.22	-20.13	-1.405	-11.38	-11.37	-11.41
Machinery	-10.64	-21.02	-21.02	-21.00	-10.89	-10.54	-10.57	-10.45	-1.385	-6.67	-6.65	-6.71
Miscellaneous Ind.	-10.54	-11.50	-11.45	-11.56	-10.83	-7.57	-7.57	-7.57	-1.349	3.87	3.91	3.82
Construction	-10.64	-12.96	-12.96	-12.94	-10.89	-5.18	-5.21	-5.10	-1.379	-2.80	-2.78	-2.84
Utility	-10.61	-13.34	-13.33	-13.36	-10.87	-10.54	-10.56	-10.42	-1.39	-1.17	-1.15	-1.23
Trade Services	-10.67	-11.25	-11.27	-11.24	-10.99	-11.60	-11.69	-11.58	-1.322	-1.31	-1.26	-1.32
Social Services	-10.43	-10.07	-9.97	-10.16	-10.86	-12.82	-12.83	-12.80	-1.324	-1.47	-1.43	-1.51
Public Administration	-10.51	-9.22	-9.16	-9.23	-10.99	-10.74	-10.83	-10.72	-1.289	-0.56	-0.49	-0.57
Financial Services	-10.60	-11.13	-11.12	-11.16	-10.89	-13.21	-13.24	-13.12	-1.378	-1.20	-1.18	-1.26
Other Services	-10.48	-10.10	-10.03	-10.22	-10.79	-13.75	-13.73	-13.77	-1.342	-1.06	-1.03	-1.12

Note: All Factors are mobile.